

Notice No.1

Rules for the Manufacture, Testing and Certification of Materials July 2016

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices.
Any corrigenda included in the Notice are effective immediately.

Issue date: August 2016

Amendments to	Effective date
Chapter 1, Sections 1, 2 & 6	Corrigenda
Chapter 3, Section 3	Corrigenda
Chapter 12, Sections 2 & 3	Corrigenda
Chapter 14, Sections 2 & 4	Corrigenda



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Chapter 1

General Requirements

■ Section 1

Scope

1.1 General

1.1.2 Wrought, cast and extruded materials are to comply with the requirements of *Ch 1 General Requirements* and *Ch 2 Testing Procedures for Metallic Materials*, and the appropriate specific requirements of *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* of these Rules *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* to *Ch 9 Copper Alloys*. Mooring and anchoring equipment is to comply with the requirements of *Ch 1 General Requirements* and *Ch 2 Testing Procedures for Metallic Materials*, and the appropriate specific requirements of *Ch 10 Equipment for Mooring and Anchoring*. Manufacturers of these materials must be approved by LR according to the requirements in *Ch 1, 2 Approval and survey requirements* or *Ch 1, 3 Certification of materials*. Only those materials within a manufacturer's scope of approval may be used.

■ Section 2

Approval and survey requirements

2.1 Approval and survey requirements – General

2.1.1 Marine materials manufactured in accordance with *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* to *Ch 10 Equipment for Mooring and Anchoring* of these Rules are to be made at works which have been approved by LR for the type and grade of product being supplied.

2.1.2 Materials manufactured in accordance with *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* *Ch 3 Rolled Steel Plates, Strip, Sections and Bars* to *Ch 10 Equipment for Mooring and Anchoring* of these Rules are to be manufactured, tested and inspected under Survey according to the requirements of one of the following two schemes:

- (a) The Materials Survey Scheme, see *Ch 1, 2.3 Materials Survey Scheme*.
- (b) The Materials Quality Scheme, see *Ch 1, 2.4 Materials Quality Scheme*.

■ Section 6

References

6.1 General

Table 1.6.1 List of National and International Standards

Rule reference	Standard
Chapter 1 – General Requirements	ISO 9001: 2005 SNT-TC-1A, 2011 ISO 9712:2012
Chapter 2 – Testing Procedures for Metallic Materials	ISO 6892-1: 2009 ISO 6892-2:2009 ISO 185: 2005 ISO 2566-1: 1999 ISO 148-1: 2010 ISO 7500-1: 2004 ISO 6506-1: 2014 ISO 6506-2: 2014 ISO 6506-3: 2014 ISO 6507-1: 2006 ISO 6507-2: 2006 ISO 6507-3: 2006 ISO 6507-3: 2006 ISO 6508-1: 2015 ASTM E23-Rev C (2012)
Chapter 3 – Rolled Steel Plates, Strip, Sections and Bars	EN 10160: 1999 ASTM A578-07 (2012) ASTM E112 – 2013 ASTM E381-01 (2012) ASTM A255-2010 ISO 7452:2013 ASTM E208-06 (2012) JWES2815
Chapter 4 – Steel Castings	ISO 1161: 1984/Amendment 1: 2007
Chapter 5 – Steel forgings	ASTM E112 (2013)

Chapter 8 – Aluminium Alloys	ASTM G66 (2013) ASTM G67 (2013)
Chapter 9 – Copper Alloys	ASTM E272-2010 EN 1057: 2006 +A1: 2010
Chapter 10 – Equipment for Mooring and Anchoring	ISO 1704: 2008 ISO 1834: 1999 BS 7160 (R2002) ASTM E112 (2013) ASTM E381-01 (2012) ASTM A255-2010
Chapter 11 – Approval of Welding Consumables	ISO 3690: 2012 ISO 10042: 2005 ASTM G48 – 11
Chapter 12 – Welding Qualifications	ISO 6947: 2011 ISO 5817: 2014 ISO 6520-1: 2007 ISO 6507-1: 2005 ISO 10042: 2005 ASTM G48-11 ISO 25239-3: 2011 ISO 25239-4: 2011
Chapter 13 – Requirements for Welded Construction	ISO 9712:2012 ISO 25239-5: 2011 ISO 6520-1: 2007 SNT TC-1A-2011 AWS D3.6M:2010 ISO 10042: 2005
Chapter 14 – Plastics Materials	ISO 527-2: -2012 ISO 178: 2010 Amd 1:2013 ISO 62: 2008 ISO 75-2: 2013 ISO 604: 2002 ISO 527-4: 1997 ISO 14125: 1998/AMD1:2011 ISO 14130: 1997/Corr1:2003 ISO 1172: 1996 ISO 1922- 2012 ASTM C273/C273M -11 ASTM C393/C393M -11e1 ISO 845- 2006 ASTM C297/C297M-04 (2010) ISO 844-2014 ISO 180-2000/Amd 2:2013 ASTM D2583-13a BS 2782-10 Method 1001: 1977 ISO 175: 2010

Chapter 3

Rolled Steel Plates, Strip, Sections and Bars

■ **Section 3**

Higher strength steels for ship and other structural applications

3.1 Scope

Table 3.3.1 Maximum thickness limits

Steel designation				Maximum thickness mm	
AH 27S	DH 27S	EH 27S	FH27S	Plates and wide flats	Sections and bars
AH 32	DH 32	EH 32	FH32	100	50
AH 36	DH 36	EH 36	FH36		
AH 40	DH 40	EH40 (see Note 1)	FH40		Not applicable
EH 47 (see Note 1)					

Note 1. Where the thickness of grade EH40 materials exceeds 85 mm the material is to achieve a crack arrest temperature (CAT) below -10°C. The CAT may be measured directly from large scale isothermal tests or be estimated from small scale tests that determine the Nil Ductility Temperature and applying a relationship such as the following, which has been validated at the approval stage:

$$\text{CAT} = (\text{NDTT} + 10) + \left[\left(\frac{\ln \sigma}{0.046} \right) - 105 \right] + [153(B-5)^{1/13} - 190] \quad \text{where}$$

$$\text{CAT} = (\text{NDTT} + 10) + \left[\left(\frac{\ln \sigma}{0.046} \right) - 105 \right] + [153(B-5)^{1/13} - 190]$$

CAT = crack arrest temperature in °C

NDTT = nil ductility test temperature in °C

σ = 2/3 of the minimum specified yield strength in N/mm²

B = thickness of the plate in mm

As an alternative to crack arrest temperature, crack arrest properties may be demonstrated by large scale ESSO tests where $K_{ca} \geq 6000$ K_{ca} ≥ 6000 N/mm^{1.5} at -10°C or other approved methods.

Note 2. Minimum thickness for EH47 is 50 mm. The crack arrest properties of EH47 are to be determined as described in Note 1. Where the K_{ca} ESSO test is used and where the thickness of the steel exceeds 80 mm, the required K_{ca} value for the brittle crack arrest steel plate is to be specifically agreed with LR.

Chapter 12

Welding Qualifications

■ **Section 2**

Welding procedure qualification tests for steels

2.3 Steel test assemblies

2.3.1 Tests are to be performed using the welding process and positions anticipated for actual construction. The weld test assemblies are to be representative of construction conditions and are to be welded in the same manner as intended for the actual production welds. Where prefabrication primers are used in the shipyard, these are to be included in the test assemblies.

■ **Section 3**

Specific requirements for stainless steels

3.2 Austenitic stainless steels

3.2.4 For cryogenic or corrosion resistant applications, the ferrite content in the weld cap region is to be measured and is to be in the range 2 to 10 per cent, with the exception of grades S 31245 S 31254 and N 08904 where the content is to be nominally zero.

Chapter 14

Plastics Materials and other Non-Metallic Materials

■ *Section 2*

Tests on polymers, resins, reinforcements and associated materials

2.4 Reinforcements

2.4.6 Additionally, tests in *Ch 14, 2.4 Reinforcements 2.4.4(c) and (f)* are to be repeated, in one direction only, after immersion in fresh water at 35°C for 28 days with the exception of *Ch 14, 2.4 Reinforcements 2.4.4(k)*.

■ *Section 4*

Plastics Plastic pipes and fittings

4.1 Scope

4.1.1 This Section gives the general requirements for ~~plastics~~ plastic pipes and fittings, with or without reinforcement, intended for use in the services listed in the relevant Rules dealing with design and construction. Hoses and mechanical couplings are not covered by these requirements.

4.1.3 As an alternative to *Ch 14, 4.1 Scope 4.1.2*, ~~plastics~~ plastic pipes and fittings which comply with National or proprietary specifications may be accepted, provided that the specifications give reasonable equivalence to the requirements of this Section or, alternatively, are approved for a specific application. The survey and certification are however to be carried out in accordance with the requirements of this Section.

4.3 Manufacture

4.3.1 ~~Plastics~~ Plastic pipes and fittings intended for use in Class I, Class II and Class III systems are to be manufactured at facilities approved by LR, using materials approved by LR.

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